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ABSTRACT

This brief, largely pictorial guide to protective clothing for pesticide users addresses moderately to highly toxic pesticides. The guide discusses the potential hazards of pesticides and the kinds of clothing and equipment that should be worn for personal protection. It also explains how the type of pesticide formulation affects an individual's chances for exposure, and how to clean, maintain, and store personal protective equipment such as respirators, boots, masks, and clothing. The guide illustrates and describes washing procedures during and after pesticide use, levels of toxicity, formulations, precautionary statements on hazards to humans shown on pesticide labels, handling of concentrates, and the protective clothing and equipment needed for either minimum or maximum exposure to various chemical formulations. (CS)

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Protective Clothing for Pesticide Users

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Handling Concentrates

This is the *minimum* protective clothing and equipment you should wear while mixing and loading pesticides which are moderately to highly toxic.

Face shield or goggles

Respirator (If the label requires it)

Protective suit (such as fabric coveralls) worn over normal work clothes

Chemical-resistant apron

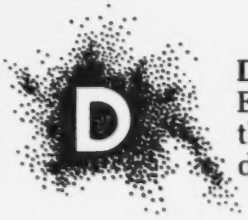
Chemical-resistant gloves such as rubber, vinyl, or plastic
(Never use fabric, leather or paper gloves)

Chemical-resistant boots or footwear
(Never wear leather or canvas footwear)

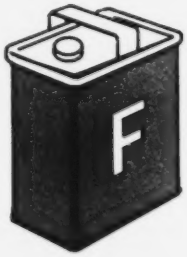
Formulations

Granules
Generally low exposure
No wetting spray
Little dust

Wettable Powders
All routes of exposure can be high during mixing due to high percentage of active ingredient



Dusts
Exposure can be high through inhalation and dermal contact



Flowables
Dermal exposure to mixer/loader and applicator may be high

Emulsifiable Concentrates
Exposure dermally may be high during mixing/loading/ application.
Absorption is enhanced by solvents which easily penetrate the skin.

Any formulation applied as a spray may cause a dermal exposure.

Hazards to Humans

Precautionary Statements

Look on the pesticide label under the boldface heading "Hazards to Humans." The statements in this section indicate which part or parts of the body should be protected.

"May be fatal if absorbed through skin. Do not get in eyes, on skin, or on clothing."

"May be fatal if inhaled. Do not breathe dust, vapor, or spray mist."

"Corrosive: causes irreversible eye damage."

"Causes skin irritation."

or

"Causes burns. Do not get on skin or on clothing."

Wear chemical-resistant boots or footwear during most mixing, loading, and application jobs. *Never wear leather or canvas shoes*.

It is also important to protect your eyes from pesticides. Use a face shield or goggles when you are using pressurized equipment or liquid concentrates; where there is a chance for mists, dusts, or splashes; and when the label tells you to prevent eye exposure.

Breathing the pesticide into your lungs (inhalation exposure) may be a problem where dusts, fine spray mists, smoke, fog, or vapors are generated. Since an inhaled pesticide is rapidly and almost completely absorbed by the body, you *must* protect yourself from this kind of exposure.

You should consider wearing a respirator during mixing and loading or during long periods of exposure to highly toxic pesticides which create fine dusts or mists. Sometimes the label lists a specific type of respirator to use. Often, however, the label merely requires a respirator approved for pesticide use by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA). To choose the right respirator, you must seek advice from your county Extension agent, pesticide dealer, or other experts.

The two most common types of air-purifying respirators are 1) mechanical filter respirators and 2) chemical cartridges or canisters. You should understand the differences between them:

- Mechanical filter respirators provide protection only against dusts.
- Chemical cartridge or canister respirators provide protection only against gases and vapors.

In addition, you can get a combination respirator which will protect you against both dusts and gases.

Know How To Care for Your Protective Equipment

Your protective clothing and equipment can become contaminated:

- during normal handling and application of concentrated or dilute pesticides, or
- because of an accident.

Unless you remove the contaminated items promptly, they can cause you to absorb pesticides through your skin. Have clean protective clothing and equipment on hand at all times to replace contaminated clothing.

To keep your protective clothing and equipment working well, clean it thoroughly. Never allow children or pets to come into contact with contaminated clothing or equipment. Here are some general guidelines for cleaning:

Respirators — Discard cartridges, canisters, and filter pads when breathing becomes difficult, when you notice a pesticide odor, or at the time interval specified by the manufacturer. Write the date on the cartridge when it is first used. Wash the face piece in detergent and water, rinse it thoroughly, and dry it in a well-ventilated area. Never use alcohol or other solvents for cleaning — they will damage rubber and plastic.

Rubber, vinyl, or plastic boots and gloves — To avoid getting pesticide on your hands, wash the outside of boots and gloves with detergent and water before removing them. After you take them off, wash them inside and out with detergent and water, rinse thoroughly, and dry in a well-ventilated area.

Chemical-resistant clothing, goggles, and face masks — Wash plastic or rubber clothing and equipment with detergent and water, rinse thoroughly, and dry in a well-ventilated area.

Fabric clothing — If fabric clothing is saturated with a concentrated highly toxic pesticide, it must be discarded. Remove the clothing carefully and immediately place it in a plastic trash bag. Close the bag tightly and dispose of it along with your empty pesticide containers. Wear rubber, vinyl, or plastic gloves when handling severely contaminated clothing.

Launder normally contaminated clothes at the end of the work day, following these guidelines:

- Wash contaminated clothing separately from the family clothing.
- Prerinse clothing outdoors by spraying or hosing it; or presoak it in a suitable container such as a large bucket or tub; or use the prewash cycle of an automatic washer, with detergent.
- Wash clothes using hot water, the highest water level, and a regular or super wash cycle. Use heavy-duty detergents; for EC and other oil-based formulations, use a heavy-duty liquid detergent. Wash only a few contaminated garments at a time.
- Wash contaminated garments at least twice; then thoroughly rinse the washer by running through another entire cycle using detergent.
- Line dry to avoid a buildup of pesticide residues in the dryer.

Protective Clothing for Pesticide Users

Pesticides can be beneficial tools. They help control pests — such as weeds, insects, and plant diseases — which transmit disease, destroy crops, or cause damage to property. They allow high-quality food and fiber crops to be grown at a lower cost to consumers. Like many other chemicals, though, pesticides can be hazardous if not used safely.

Most pesticide accidents happen when users are careless or when they do not know how to handle pesticides safely. The time you spend to learn about the safe use of pesticides is an investment in the health and safety of yourself, your family, and others.

This guide deals mainly with pesticides which are highly to moderately toxic when they enter the body through the mouth, lungs, skin, or eyes. You can recognize these pesticides by the "signal words" DANGER or WARNING on their labels.

In this guide, you can learn about:

- the potential hazards of pesticides, and
- the kinds of clothing and equipment you should wear to protect yourself.

It also will tell you:

- how the type of pesticide formulation affects your chances for exposure, and
- how to clean, maintain, and store your personal protective equipment.

Know the Hazards

To use any pesticide safely, you must know the hazards involved and how to protect yourself. Remember this basic rule: *By lowering your exposure to the pesticide, you can lower the risk to your safety and health.*

Read the label CAREFULLY. One section of the label will tell you of any fire, explosion, or chemical hazards of the product. Knowledge that the chemical is highly flammable or corrosive will allow you to avoid these hazards.

The label also tells about the toxicity of the product. The level of toxicity is a measure of how poisonous a chemical substance is to humans.

Pesticides can enter the body in three ways:

- through the mouth (orally),
- through the skin and eyes (dermally),
- through the lungs (by inhalation).

First, you need to know how toxic the product is. Look at the "signal word" (DANGER, WARNING, or CAUTION) to find out.

Next, you must find out how the pesticide can enter your body. Look under the boldface heading "Hazards to Humans". The statements in this section indicate which part or parts of the body should be protected from exposure to the pesticide. For example: "Fatal if swallowed or absorbed through the skin. Do not get on skin."

Use Personal Protective Equipment

Simply understanding the hazard of the pesticide you are using is not enough. To keep yourself safe, you also must be sure to properly use all the recommended protective equipment.

Pesticide absorption through the skin is the most common cause of poisoning during mixing, loading, application, and equipment maintenance. You can keep skin exposure to a minimum by wearing — over your normal work clothes — a long-sleeved protective suit, such as coveralls. It should cover your entire body except feet, hands, and head. If there is a chance that the coveralls may become wet from mist, spray, splashes, or spills, use a rubber apron or other outer garment that is resistant to chemicals.

Natural or synthetic rubber, vinyl, or plastic gloves are a very important way to keep pesticides away from your skin. Wearing gloves should be a standard practice when handling pesticides. Replace protective gloves often, even though they may not seem worn or contaminated. *Never use leather, paper, or fabric gloves when working with pesticides.* These materials easily absorb and hold liquids and dusts, and can become a serious source of exposure. Disposable gloves are appropriate if they can resist chemical penetration and are sturdy enough to resist puncturing or tearing during the period of use.

Wear chemical-resistant boots or footwear during most mixing, loading, and application jobs. *Never wear leather or canvas shoes.*

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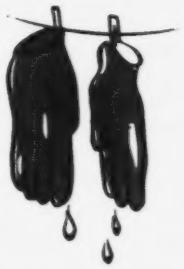
- Wash contaminated garments at least twice; then thoroughly rinse the washer by running through another entire cycle using detergent.
- Line dry to avoid a buildup of pesticide residues in the dryer.

Washup During Use

Wash hands and face before eating, drinking, toileting, or using tobacco.

Avoid touching face or other bare skin with contaminated gloves or clothing.



Washup After Use

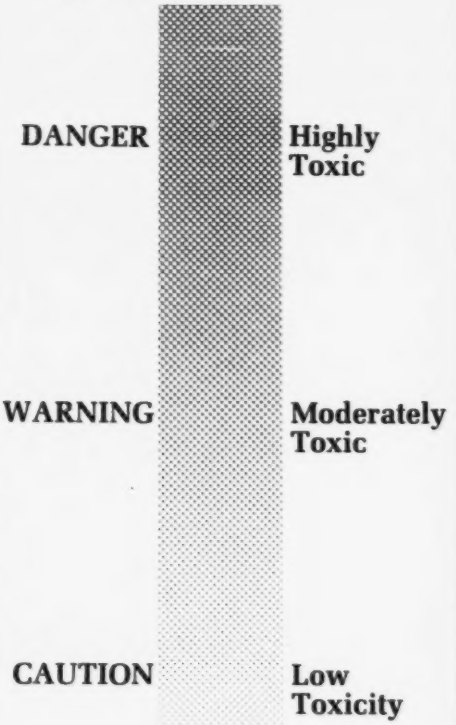
Immediately remove clothing and take a shower in case of excessive contamination.

Shower at the end of the day before changing into clean clothes.

Wash body and hair thoroughly with soap and water.

Toxicity

Signal Words



If the pesticide is *highly* toxic orally, dermally, or through inhalation, the signal word "DANGER" in large boldface letters will be on the front of the pesticide label. If the pesticide is *moderately* toxic orally, dermally, or through inhalation, the signal word "WARNING" will be used. The labels of *slightly* toxic pesticides will bear the signal word "CAUTION".

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Dilute Pesticides

You need to decide! Read the label. The formulation, signal word, precautionary statements, personal protective equipment statements, the application method, and the projected length of exposure indicate the personal protective equipment you need.

Minimum Exposure

(Such as granular applications and many other routine pesticide activities)

Protective suit (such as fabric coveralls) worn over normal work clothes

Chemical-resistant gloves such as rubber, vinyl, or plastic
(Never use fabric, leather, or paper gloves)

Socks and shoes or boots

Maximum Exposure

(Such as direct contact with drenching spray, mist blower or knapsack applications, or handling very highly toxic pesticides)

Chemical-resistant hood or hat

Goggles or face shield

Respirator (If the label requires it or if dusts, mists, fogs, or vapors will be generated)

Chemical-resistant protective suit worn over normal work clothes

(A chemical-resistant protective suit may cause heat stress under some conditions)

Chemical-resistant gloves such as rubber, vinyl, or plastic
(Never use fabric, leather, or paper gloves)

Chemical-resistant boots or footwear
(Never wear leather or canvas footwear)

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